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● The Chart Room in the mill of the Pulp Division, Weyerhaeuser Timber Company, at Longview, Washington, where all process variables are graphically recorded.



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PACIFIC PULP & PAPER INDUSTRY

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OCTOBER, 1935

No. 10

PULPWOOD*

By CHARLES W. BOYCE, Executive Secretary,
American Pulp and Paper Association

During the past few years the word "pulpwood" has not appeared frequently upon meeting programs. Apparently ample wood supplies have been available to meet the much reduced requirements of the industry. Specific and abstract lack of discussion reflects an absence of worry.

Gradually, however, pulpwood as a discussion subject is coming back. It will not be long, I venture to prophesy, before we will again find pulpwood listed prominently in our meeting programs, for the whole subject of conservation in which the President has expressed a very active interest, is becoming more and more important. The share of the industry in conservation is large.

During the 1920's when pulpwood prices were high, I used to amuse myself by trying to balance the regional spreads in prices with the trends of technical development in pulping. Comparative statistics of regional average pulpwood prices, plus transportation charges of finished paper to common markets, showed spreads that indicated two broad movements at least; that if means of use could be developed, regional shifting was bound to occur that would reduce, if not eliminate, regional price-transportation cost differentials; and that the mere existence of these differentials constituted a powerful urge for the development of the necessary technique. The differentials were so marked that they could not be overlooked, and the shifting process gained momentum almost from day to day, which speaks volumes for the work of the industry's technical staff.

What are the significances of these regional shifts? What are the conditions that affect future shifts? Specific answers are, of course, impossible. We can guess and we can try to anticipate, to gauge the technical and economic drifts.

Pulpwood Prices Have Hit Bottom

We do know that pulpwood prices have hit a bottom; they apparently reached their low level when paper prices appeared to be about to fall to zero in the winter of 1932-1933. Since then there have been increases in all regions. The

*Address before Technical Association of the Pulp and Paper Industry, Atlantic City, New Jersey.

PROPHETIC

of further development of pulp and paper manufacturing on the Pacific Coast was the talk delivered before the Fall meeting of TAPPI at Atlantic City, September 21st, by Mr. Charles W. Boyce, who has had many years of experience in practical forestry.

Pulpwood prices will, Mr. Boyce believes, be the determining factor in the regional re-allocation of the American pulp and paper industry.

He says in part, "... for quite a while now the industry has not had to worry about wood. But as lumber production increases and as general economic conditions improve, it is likely that the supply of independently cut wood will diminish and it is likely that pulpwood operators will demand more for their labor. In these forthcoming adjustments lie, I believe, the pattern of the American pulp and paper industry. The south and the Pacific Coast loom large in this picture for their large forest supplies seem likely to determine wood values in all regions, and incidentally the price of pulp and paper products."

Continuing to quote Mr. Boyce, "... The competition of these new regions in the paper markets must eventually result in the weeding out of high cost pulp mills in the older regions, thus reducing demand (for pulpwood) to a ratio similar to that in the new regions."

relation of these increases seems to me to dictate the broad outline of the future pattern.

The percentage of increase has been greater in the low cost regions than in the high cost regions, thus tending toward a reduction of regional differentials. And this indicates that we are dealing with more or less familiar economic phenomena.

In other words, the pulpwood problem is not shrouded in mystery. In analysis, at least, it presents an understandable picture compared with the complexities, for instance, of the paper market structure which is, if nothing else, mysterious beyond belief.

In the new producing regions pulpwood and lumber are closely related. It is common knowledge that the lumber industry has suffered tremendously during the depression. Consumption declined from a level of more than thirty billion board feet a year to not much more than ten billion board feet. This condition was reflected back to stumpage prices, for the supply-demand ratio was reversed.

Forest owners, many of them farmers, sought sales outlets; pulpwood seemed to offer possibilities. Little dabs of wood cut here and there created a supply which in the aggregate made it unnecessary for companies to cut on their own lands. This wood was produced largely by farmers who were willing to accept any positive return for their labor. Their costs were low, undoubtedly much lower than the cost of operation on company-owned lands and their contribution to the national pulpwood cut was abnormally higher.

Western Development Forecast

As a result the industry has had a respite; for quite a while now it has not had to worry about wood. But as lumber production increases and as general economic conditions improve, it is likely that the supply of independently cut wood will diminish and it is likely that pulpwood operators will demand more for their labor. In these forthcoming adjustments lie, I believe, the pattern of the American pulp and paper industry. The south and the Pacific Coast loom large in this picture, for their large forest supplies seem likely to determine wood values in all regions, and incidentally the price of pulp and paper products.

Two major items of pulpwood cost show constant increases from the beginning of pulpwood use up to 1930; one is stumpage price or value of wood in the forest; and the other is the cost of transporting wood from the forest to the mill.

In the late 1920's sales of pulpwood reserves at \$5 per cord on the stump, or

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even more, were not uncommon in the older producing regions. As a matter of fact, accrued costs of pulpwood reserves that had been held for relatively long periods amounted to nearly as much for the cost of timberland increases at approximately the rate of seven per cent compound interest because of taxes, interest, cost of fire protection, etc.

Over and above these costs which underlie values, the supply-demand relation was such that actual prices for long periods of time held to substantially higher levels than costs. The industry was over-developed, in respect to pulpwood supplies, in the Northeast; much of this over-development had to do with Canadian public land policies. Prior to 1910 many mills were built along the Canadian boundary to use Canadian pulpwood. The embargoes on crownland wood restricted the supply of these mills and tended to increase the drain upon domestic supplies. Values climbed steadily from the beginning of the century as evidenced by increases in f.o.b. mill pulpwood costs which increased from ranges of from \$4 to \$6 per cord in 1900 to levels that were five times those figures shortly after the war. Subsequent declines were slow up to 1930, for demand for wood kept pace with the expanding use of paper. These conditions created abnormally high values for wood reserves, which were reflected in the upward sweep of stumpage prices in the older regions.

Transportation costs from the forests to the mills increased also. This was particularly important in New York State where average charges reached \$7.50 with many mills paying as much as \$11 per cord freight on imported wood. No such high figures were reached in other regions, but the averages, none the less, rose higher and higher as distances increased.

Where Pulpwood Costs Are Low

Both stumpage prices and transportation costs were very much less in the new producing regions. In the south, for instance, a vast supply of young growth was suitable for use in the manufacture of pulp—stands that could not be made into lumber. Moreover, the use of lower grade hemlock logs for lumber in the Pacific Northwest was always of questionable profit; expanded use of pulp did not materially increase values. Even in the highest price periods pulpwood stumpage prices hardly equaled fifty cents per cord in the south, or \$1.00 per cord in the West. In both regions transportation

costs were correspondingly low. What greater urge could there be for regional shifting if the technology could be solved?

The fact that the industry in flowing to the south and to the Pacific Coast has expanded in these regions to dominating positions, means, I believe, that conditions in these regions will determine future pulpwood prices in all regions. The competition of these new regions in the paper markets must eventually result in the weeding out of high cost pulp mills in the older regions, thus reducing demand to a ratio similar to that in the new regions.

Qualities and transportation costs will play important parts in this adjustment, of course. The realization back to pulpwood in bond and book paper manufacture may be sufficient to maintain higher differentials in the regions where these grades are produced and the lower transportation charges upon paper will certainly be reflected in higher stumpage prices, or in allowable charges for transportation of wood itself. How such differentials will work out in detail is pure guess work now; but the fact remains that logical regional balances, based upon regional competition in pulp and paper, are in the making. It is safe to guess that the towering prices of the 1920's in New England are not likely to reoccur and that by the same token the low prices of 1932 in the south and West are apt to be the all-time bottoms.

Cost of Reforestation

In all future considerations one factor must be reckoned with; the domestic industry must consider, more and more, the cost of reforestation. The paper and pulp industry has done more reforestation than any other American wood-using industry. The reason is largely that the investment in forest land, although large, is much less than the investment in plant. This is not true in other forest industries. A \$200,000 sawmill, for instance, may have back of it \$5,000,000 worth of timber; a \$5,000,000 paper and pulp mill might have back of it but \$1,000,000 worth of timber. The latter industry can more easily afford to invest in reforestation if stumpage values and transportation costs can be stabilized.

But we must look beyond, at other considerations, for much as the industry has done, it is not enough to meet requirements. Many conservationists have reached the conclusion that industry

cannot be depended upon to keep forests continuously productive. This has led to a movement that has been gaining impetus in recent years to purchase forest lands and to place them under management at public expense. Appropriations for this purpose are bulking larger each year. As a matter of fact, a combination of conservationists on the one hand, and agriculturists who wish to see marginal farm lands taken out of agriculture, on the other hand, may be able to raise appropriations of federal funds for land purchase to really large figures, of fifty million a year or even more.

Such appropriations raise questions as to policy not only from the point of view of the expenditures themselves and their effect upon taxation, but also from the point of view of governmental control of timberlands. Whether the industry or the government meets the payrolls for reforestation, the price of wood must carry the burden. I do not think that this conclusion can be dodged. The parts that each play in the program are important because future control is at stake. Can the industry afford to permit control of its policies through government ownership of its raw material resources? It appears to me that this and related problems must be settled before long, for governmental purchases are by no means confined to lands that private capital may not only be able to finance, but that industry-privately financed must own if the industries are to retain their present status.

Conservation Movement Must Be Taken Seriously

The President is very much interested in conservation. As governor of New York State, he sponsored legislation relating to forest resources of that state. As President, he has given to the whole land utilization movement, and particularly to forestry, an impetus such as it has never before received. Under such circumstances, the conservation movement must be taken seriously.

Obviously, foreign trade in pulp and paper will have a far-reaching effect upon the pulpwood question. In 1923 the Forest Service reported upon the growth of a dependence upon imports which in terms of total paper consumption amounted at that time to more than one-half of the domestic total. The report developed the fact that this dependence had grown out of a shortage in the United States of spruce pulpwood, that the original stand of spruce pulpwood was limited; that it was blocked up into company holdings early in the development of the wood pulp industry; and that the reserves had not been sufficient to meet the consumption increases.

After analyzing the development of these dependencies and their trends, the report attempted to answer questions as to how domestic manufacturers could meet the national demand for paper by using domestic materials. An obvious answer was to suggest the development of pulping processes whereby other woods than spruce could be used. The report stated that there were ample supplies of pulpwood of species other than spruce to meet national requirements if methods of use were developed. It stated that to make use of these resources, a regional reallocation of the industry was necessary. It recommended the expansion of manufacture in the South, in the Pacific Northwest and in Alaska. It obvi-



Pacific Coast Pulpwood

ously recommended the adoption of scientific forest management policies. **United States Can Become Self Sufficient**

Recently, in response to the Hale Resolution, the Forest Service has reviewed the whole situation. It found that many of the recommendations of the earlier report have been followed; that regional reallocation is occurring and that there is no reason from the point of view of pulpwood supplies why the United States cannot become self-sufficient in pulp and paper products.

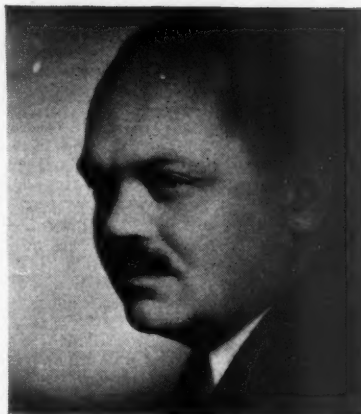
The report considers questions of national policy in respect to foreign trade. Is it wise, it asks, to undertake development of national resources and at the same time take steps to protect this development through restrictive measures on imports? It states the conclusion that in view of the necessity for fostering foreign trade, no such deliberate action should be taken, but that the whole problem should be left to economic adjustment through competitive means.

This recommendation comes very close

to being a statement of national policy. As such it sets a competitive stage upon which the whole world may play. The drama is likely to be written in terms of pulpwood prices which in the last act must be translated into the costs of growing timber itself.

All of the many questions involved in these broad considerations have two chief aspects, the economic and the technical. TAPPI is interested principally in the latter, but the direction of its energies must not be without regard to the economic aspects, for the two must be coordinated. It has been my purpose in this paper to point out this fact.

In conclusion, may I remind you that the economics and technology of raw materials have been the outstanding problems of the industry since its inception in China at the beginning of the Christian Era. Twenty centuries of effort have failed to develop permanent solutions. What our generation may add in effort and in answer is indeed an interesting speculation.



CHARLES W. BOYCE
Executive Secretary
American Paper & Pulp Association

TAPPI FALL MEETING POSTPONED

The Fall meeting of the Pacific Section of TAPPI, originally scheduled for October 11th and 12th at the New Washington Hotel, Seattle, has been postponed until Friday and Saturday, October 25th and 26th. The location remains the same. The announcement was made by Earl G. Thompson, general chairman, who said that the change in the time of the meeting would make it possible for a greater number to attend.

Ronald G. Macdonald, national secretary of TAPPI, is coming from New York to attend the Fall meeting.

Another visitor will be John Strange of the Institute of Paper Chemistry of Appleton. Mr. Strange, who is assistant to Westbrook Steele, executive secretary of the Institute, was secretary of the Central Grading Committee of the Paper Industry Authority under the NIRA and is still in close contact with grading work. He will bring with him moving pictures showing the behavior of cellulose fibre structure under the influence of various reagents. These will assist in projecting a general picture of fibre morphology.

Mr. Strange will also exhibit moving pictures of the Institute of Paper Chemistry and its equipment for research study. In addition he will discuss the present work being done in developing grading standards for pulp and paper.

Registration will open Thursday evening, October 24th, at the New Washington hotel and will be continued at 8:30 a. m. Friday morning.

The Technical Program

At 9:30 Friday morning the technical program will open. In addition to the talk and presentation of moving pictures by John Strange of the Institute of Paper Chemistry mentioned above, the following papers will be presented and discussed during the meetings Friday morning and afternoon and Saturday morning.

Relation of Physical and Chemical Constants of Pulp by George H. McGregor, technical director, Pulp Division Weyerhaeuser Timber Company.

Sulphate Pulp Quality Control by Carl Fahlstrom, technical superintendent, Longview Fibre Company.

The American Chemical Society Meeting in San Francisco. A resume' of papers on wood and cellulose chemistry will be presented by Dr. H. K. Benson, Department of Chemical Engineering, University of Washington.

Pulping of Age Rings of Douglas Fir is the title of a study made by Dr. H. K. Benson, R. B. Colby and M. D. Schmid of the University of Washington.

A paper on the Bleaching of Douglas Fir will be offered by Frank McLeod.

A summary of the latest developments in water filtration work will be presented by Kenneth Shibley in a paper titled, New Filtration Plants in the Pacific Northwest.

A discussion on fourdrinier wires will be led by William E. Buchanan of the Appleton Wire Works, Appleton, Wisconsin.

Before adjournment Saturday noon, a business meeting will be held for the purpose of electing officers to serve during the ensuing year.

Field Trip

A trip is being arranged for Saturday afternoon which will include the mills of the Everett Pulp & Paper Company and the Soundview Pulp Company in Everett, Washington. Both companies have cordially invited those attending the TAPPI meeting to visit their plants. A counter attraction Saturday afternoon is the football game between the University of Washington and Stanford University.

The Social Side

The ladies are invited to attend the luncheon Friday noon to hear Lieutenant-Colonel Abbott Boone discuss the Italo-Ethiopian situation. Lieutenant-Colonel Boone is well known throughout the Northwest as an interesting and able speaker on military affairs.

At the banquet Friday evening Cassius Gates, prominent Seattle attorney and former president of the Chamber of Commerce will deliver an address. The evening will be concluded with dancing in the main dining room at the New Washington hotel.

No luncheon is planned for Saturday

the 26th, that evening at 7:30 general chairman Earl Thompson has planned a cabaret style dinner at the New Washington, which will be followed by dancing at 9 o'clock.

Mrs. A. S. Quinn is arranging an interesting ladies program. Mr. Leo S. Burdon, manager of the Soundview Pulp Company made arrangements for the speakers.

Remember the dates, Friday and Saturday, October 25th and 26th, and the place, the New Washington Hotel in Seattle. All reservations should be made with Earl G. Thompson, general chairman, 1201 Textile Tower, Seattle.

PEABODY TO MOVE TO SAN FRANCISCO

Leonard Peabody, from the Longview, Wash., plant of the Longview Fibre Company, will shortly be transferred to the San Francisco office of the company. He will move to San Francisco probably before the first of the year.

R. G. Armstrong, formerly of Appleton, Wis., has recently been added to the Longview staff and will handle the duties formerly handled by Mr. Peabody.

WALDO DODGE DIES

The many friends of Waldo E. Dodge, chief engineer of the Longview Fibre Company, Longview, Wash., were shocked to hear of his sudden death on September 28. Mr. Dodge had an attack of influenza several months ago and apparently fully recovered. Just a few days prior to his death he mentioned feeling badly. Examination revealed infection, which started in the neck and proved fatal almost immediately. Funeral services were held in Portland, on October 1.

PUGET SOUND DIVIDENDS

At a meeting of the board of directors of the Puget Sound Pulp & Timber Co., Bellingham, Wash., held on September 17, a resolution was adopted to pay a dividend of 25 cents per share on the new common stock of the corporation, payable November 1, to holders of record of such new stock at the close of business on October 15.

VANCOUVER KRAFT REORGANIZATION PROGRESS

Efforts to straighten out the affairs of Vancouver Kraft Company and get it on an operating basis were made at a meeting held in Vancouver, B. C., September 11, at which a lease or operating agreement was drawn up and signed by F. W. Leadbetter, president, and Pittock Leadbetter, secretary, and the chief executives of a new concern known as Port Mellon Operating Company. If the latter organization is able to raise sufficient funds it may proceed to put the Kraft company's plant at Port Mellon, Howe Sound, in operating condition and commence the manufacture of lumber and pulp.

Vancouver Kraft Company commenced construction of its mill at Port Mellon in 1928, but operations were shut down before production had begun. Since then the company has been through various stages of liquidation and with the market for pulp depressed there seemed little likelihood of an early resumption of operations. However, this spring, with market prospects improved, the trustee, the National Trust Company, moved to realize on the mortgage investment, with the result that various alternative courses were suggested by the Leadbetter interests, which have been in control. The latest proposal, as outlined, is that an operating company shall take over the property on a five years' lease if suitable financing can be arranged. W. E. Burns is president of the operating company and A. S. Fleming secretary.

Provision is made for a loan of up to \$400,000 to the lessor for the purpose of completing construction, paying expenses of the bondholders' committee, meeting prior charges against the company and providing working capital. The loan is to be repaid on or before the expiration of five years, the loan in the meantime bearing interest at 6 per cent.

The lessee agrees, among other things, to elect and continue upon its board of directors A. W. Witherspoon of Spokane, Wash., as a director representing the bondholders.

The lease has been approved by a committee of bondholders including Sidney Teiser, A. L. Grutze, William S. Walton, Herbert W. Erskine and A. W. Witherspoon.

The September meeting was the sequel to a series of other meetings in Vancouver and Portland, a meeting of bondholders on July 9 having tentatively sanctioned the lease that has now been negotiated.

The company's only barrier now, as in the past, is lack of funds. If these are provided it may be possible to resume construction this year.

The plant was originally designed to have a maximum capacity of 110 tons per day and would include a sawmill, dry kilns and planing mill with a capacity of 200,000 feet daily. The property included rights to timber on 2,000 acres estimated at 50,000,000 feet. A hydro-electric plant of 6,900 horsepower and mill site of seventy-three acres with deep water frontage of about half a mile completed the holdings.

At the meeting on July 9 bondholders passed an extraordinary resolution authorizing the company to negotiate a lease or working agreement and also the terms of a loan, the lease to be for not more than five years and the loan to be for not more than \$400,000. The bondholders were required to pass on the terms at a

subsequent meeting. At their meeting September 11 the terms were approved.

The lease is not effective, however, until the lessee obtains for company purposes the sum of \$400,000. Of this amount \$100,000 is required to take care of prior liens, taxes, etc., and a similar amount to complete the plant and put it into operation. The balance of \$200,000 will be required for working capital.

The Port Mellon Operating Company, which has been incorporated to acquire the Vancouver Kraft property, has an authorized capital of 400 shares without nominal or par value.

PRINCE RUPERT PAPER MILL PLANS MAKING PROGRESS

Another important step toward establishment of a pulp and paper mill at Prince Rupert was taken during the past month when the Canadian government announced sale of the floating drydock, shipyards and lands formerly owned by the Grand Trunk Pacific Development Company to the Mutual Pulp & Paper Company, organized by Frank L. Buckley, of Vancouver, whose plans were announced in a previous issue of Pacific Pulp & Paper Industry.

Mr. Buckley is still in the east working on financial details of the deal, but his representatives in Vancouver said that it had been decided to build the proposed pulp mill on the drydock site, and that construction would probably be started within a couple of months.

The Mutual company has agreed to pay \$500,000 for the property under terms not yet announced, and forfeits a subsidy agreement whereby the government had paid the development company \$76,970 annually for operating the drydock and shipyard. The subsidy had seven more years to run.

In acquiring the dock and other property the company gave the government an undertaking to build a pulp mill and in the announcement from Ottawa it was intimated that in addition to bleached sulphite pulp the company would take steps to manufacture rayon pulp, which would be the first development of its kind in British Columbia.

Mutual Pulp is said to have acquired an extensive tract of timber in the Bella Coola district for pulpwood supply. Arrangements have been completed for obtaining water from a nearby lake, and power will be produced at its own plant or bought from Northern B. C. Power Company. L. A. DeGuere, engineer engaged to investigate power and other problems for the company, has returned to Wisconsin Rapids, but will return later in the year to confer with Mr. Buckley and other representatives of the company.

Use of the floating drydock, which had been held in the name of Canadian National Railways, which took over all assets of the Grand Trunk Pacific, will give the company a location close to the center of Prince Rupert and tidewater facilities.

CALLING ON FOREIGN CUSTOMERS

F. Sundblad, export representative of the Puget Sound Pulp & Timber Co., Bellingham, Wash., has written to Pacific Pulp & Paper Industry to compliment the publication on the interests shown by the foreign pulp and paper manufacturers in the statistical and other valuable information carried in the publication. Mr. Sundblad is stationed in New York City, but is again leaving for foreign markets to call on the customers of the company.

INSTALLING CHIPPER

Bradley-Woodard Lumber Company, Bradwood, Ore., is installing a chipper. This sawmill is so located as to make possible the barge shipment of pulp chips to any point on the Columbia River. The company cuts hemlock mainly and has an excellent quality of wood to chip.

FIR-TEX BUSINESS IMPROVING

Sales of Fir-Tex are slowly and surely mounting and the plant of the Fir-Tex Insulating Board Co. is operating rather steadily, though not at full capacity. Building is showing improvement and sales of Fir-Tex for this purpose are increasing. Demand from the refrigeration field is also showing an increase.

The company is manufacturing Kindle-Stix for the Kindle-Stix Corporation and is finding a rather surprising volume of business in this direction.

SPAULDING PRODUCING HEAVILY

Spaulding Pulp & Paper Co., Newberg, Ore., is getting increased efficiency from the mill and in August put through the largest tonnage in the history of the plant. Preliminary figures for September indicated that the August record would be slightly bettered.

The Spaulding organization has been making progress in developing a domestic market. When the present management took hold of the plant, almost the entire output was exported to Japan, but now the eastern United States market is absorbing around 50 per cent of the production. China is taking some pulp from this plant.

The Spaulding Pulp & Paper Company has been running without appreciable interruption since it resumed in February, 1934, except when the long-shore strike in 1934 caused a shutdown due to difficulty in getting sulphur. The company has an order file sufficiently large to keep it operating to capacity for the balance of this year.

While no financial statement has been made public, the company is said to be making profit sufficient to leave a margin after expenses and interest on the \$50,000 of series A, 6 per cent bonds created in 1932 as part of the emergency financing that provided needed working capital.

Pulp shipments in September exceeded production. Wood supply is now being obtained largely in the shape of logs.

FARMER BACK ON JOB

U. Grant Farmer, general superintendent, Fibreboard Products, Inc., Southern California Division, Los Angeles, is back on the job after a serious illness. Mr. Farmer was operated on for appendicitis several months ago, but did not recover quickly and had to take a considerable rest before resuming his duties.

WALKER MARRIED

Richard W. Walker of the sales department of the Inland Empire Paper Co., who now works out of the Millwood office, was married Sept. 17 to Miss Margaret Carroll Daly at the Cathedral of the Madeleine in Salt Lake City.

Mr. Walker is the step-son of Wm. A. Brazeau, secretary and sales manager of the Inland Empire mill. After the wedding, Mr. Walker and his bride visited Los Angeles, where he formerly was stationed with the company's California representative, S. R. Whiting.

WESTMINSTER PAYS REGULAR DIVIDEND

Owing to a general reduction in selling prices during the past year, the earnings of Westminster Paper Company, New Westminster, B. C., showed a decline for the first time since 1931. Net profit for 1934 amounted to \$12,968 after payment of bond interest, depreciation and income taxes. The net profit had been \$25,687 the previous year.

The company maintained its dividend policy this year paying 4 per cent on common. It was necessary to draw on surplus account to the extent of \$6,148, as payment of dividends requires \$19,116.

Sales for the year ending July 31, 1935, totaled \$558,845 as against \$569,798 the previous year, according to the annual report just issued. Discounts and allowances amounted to \$16,237 and cost of sales to \$398,291, so that gross profit was \$144,317, as compared with \$157,412 last year.

Miscellaneous income representing interest on the company's investment of \$100,000 in the 6½ per cent first mortgage bonds of Pacific Coast Paper Company of Bellingham amounted to \$6,175. Selling and administration expenses amounted to \$75,284. Depreciation allowance was \$36,180.

The company's balance sheet shows improvement of \$5,723 in working capital, net current assets amounting to \$122,570 as against \$115,847. Inventories are higher at \$113,226, as against \$92,935. Capital assets are given as \$629,771 as compared with \$654,914. The sinking funds were increased from \$29,545 to \$42,002.

B. C. PLANT MAKING IMPROVEMENT

Woodfibre mill of B. C. Pulp & Paper Company is still shut down for extensive repairs. The company is taking advantage of a temporary lull in the market, due to elimination of Japanese business, to effect considerable work which could not be done while the mill was operating. A section of the pipe-line is being replaced and a new roof is being put on the machine room.

The Port Alice mill is operating as usual. The Woodfibre plant has been closed down since September 1 and no date has been fixed for the re-opening. Meanwhile the company is exploring new outlets for pulp that used to find ready sale in Japan prior to the trade war.

The company has been able to improve its earnings to some extent during the past year owing to more stabilized price conditions, although the immediate future has been clouded by the effects of the Japanese embargo on Canadian pulp. The company brought interest payments up to date on the first mortgage bonds last November, and no interest is now overdue on these bonds. A payment was made May 1 on the company's 7 per cent general mortgage bonds, being the first payment since May 1, 1932. Holders of the general mortgage bonds agreed to deferment of interest instalments from November 1, 1932, to November 1, 1934, on the understanding that they should become payable May 1, 1936.

Extent of the improvement during 1934 is indicated by the fact that profit on operations before depreciation and bond interest was reported at \$706,834 compared with \$404,072 in 1933 and with an operating loss of \$72,206 in 1932. After depreciation and interest a loss of \$21,619 was reported for the year 1934 compared with a loss of \$260,717 in 1933.

TASMANIAN PAPER MILL PLANS

Thorold Fink, chairman of the board, and L. R. Benjamin, technical adviser, of the Derwent Valley Paper Co., Ltd., Hobart, Tasmania, will arrive on the Pacific Coast about the middle of October to further study United States equipment employed in logging and in pulp and paper manufacture. While here they will probably purchase part of the equipment for the plant to be erected at Hobart, Tasmania, which will have a capacity of upwards of 100,000 tons annually. Paul E. Freydis, who spent almost a year in Tasmania as a consultant on logging, is now in Seattle and has opened a temporary office in the White Building.

The Tasmanian Government very recently approved an act which makes it feasible to develop a pulp and paper industry in Australia. Under the provisions of this act, the Derwent Valley Paper Co., Ltd., plans to proceed, as promptly as is consistent with careful design, with the construction of its projected pulp and paper mill, utilizing Eucalyptus as raw material.

The Derwent Valley Paper Co., Ltd., under the provisions of the act, will secure its electric power from the Tasmanian government. The paper company is affiliated with the Melbourne Herald, which, with its affiliated publications, will provide a market for the bulk of the

production. The timber development, under the act, will be carried forward under a perpetual, or sustained yield, basis. The species of Eucalyptus to be employed in paper making has been tested upon a commercial basis, some 2,000 cords of which were put through test runs at the plants of the Crown-Willamette Paper Co., Camas, Wash., and Pacific Mills, Ltd., Ocean Falls, B. C.

Thorold Fink, chairman of the board, is a son of the founder and present executive head of the Melbourne Herald. L. R. Benjamin, technical advisor to the company, has had pulp and paper experience in England and in the Scandinavian countries. Both Mr. Fink and Mr. Benjamin are natives of Australia.

Derwent Valley Paper Co., Ltd., has erected a laboratory at Hobart, where at present John Sommerville, who has had extensive experience in England, and H. Lethlene, an expert in the production of mechanical pulp, are carrying forward further tests, the results of which will be utilized in the construction of the plant.

The Eucalyptus timber, in virgin stands, runs from 40,000 to 150,000 feet to the acre and is from 200 to 300 feet high. The base diameter runs from around 3 feet to 12 or 13 feet. The bark is easily removed. It is probable that a combination of tractor and donkey logging will be employed.

REVIEWS LABOR SITUATION

A. E. McMaster, vice-president and general manager of Powell River Company, gave evidence regarding the company's attitude towards labor during the sessions in Vancouver of the waterfront strike enquiry, presided over by Supreme Court Judge H. H. Davis.

Mr. McMaster gave a history of the company's operations, especially regarding its policy towards the handling of cargoes, and said that up to 1931 ships calling at Powell River for newsprint were worked by regular company employees. Owing to unemployment, since that time the ships had been worked by gangs made up partly of regulars and partly of "casual" employees, he said.

On May 17 Ivan Emery, president of Vancouver Longshore & Water Transport Workers Association, placed a demand before the company that in future it must engaged only union longshoremen. The company refused to commit itself to such a policy and released all workers other than its regular crews. This action led to the strike which since then has led to Powell River cargoes being declared "unfair" in several Pacific Coast ports, notably San Francisco and Oakland.

"We have never been asked to consider organized labor and have never discriminated against it," said Mr. McMaster. "Nor have we ever refused to discuss any complaint made by our employees."

In reviewing the company's history Mr. McMaster recalled that the company commenced operation of its first 100-ton mill in May, 1912, and that by 1929 had a capital investment of nearly \$17,000,000. This included the adjacent waterpower development of Lois River which the company created in 1929 at a cost of \$7,000,000.

During the building of the town of Powell River the company employed nearly 1,300 men on construction work in

addition to 1,400 regular employees working in the mill.

Of men on longshore work from January 1 of this year until May 1, 47.6 per cent were the company's regular employees, while the remaining 52.4 per cent were casual labor.

ST. HELENS PULP AND PAPER RETIRING BONDS

The United States National Bank, of Portland, as trustee under the first mortgage on the St. Helens Pulp & Paper Co., St. Helens, Ore., is redeeming and retiring all first mortgage bonds now outstanding. The company was unable to buy, according to a statement, the bonds in the open market at or below 103 per cent of the face value plus interest.

Therefore, under the terms of the bond issue, the trustee is making redemption at par value plus 3 per cent premium and interest to the next interest date. Notice has been sent out that the bonds will cease to bear interest after October 1, 1935.

The company endeavored to buy the bonds in the open market, but holders, considering them a prime investment, would not sell. The original issue was \$1,000,000 and had been reduced by slightly more than one-half.

BELL-IRVING

R. Bell-Irving, assistant general manager of Powell River Company, accompanied by Mrs. Bell-Irving, is now touring Europe on a vacation.

SIEBERS VISITS EAST

Antone Siebers, machine superintendent, Longview Fibre Co., Longview, Wash., recently made a trip east in which he visited a number of his old friends in various Wisconsin points.

HAWLEY WINS SWEEPSTAKES

"Territorial Days" recently descended upon Oregon City, when the pages of history were turned back for 90 years and the entire community spent two days in celebrating the time when Oregon City was the territorial capital of Western America. The celebration with a great variety of entertainment was wholeheartedly entered into by the industrial firms in the community.

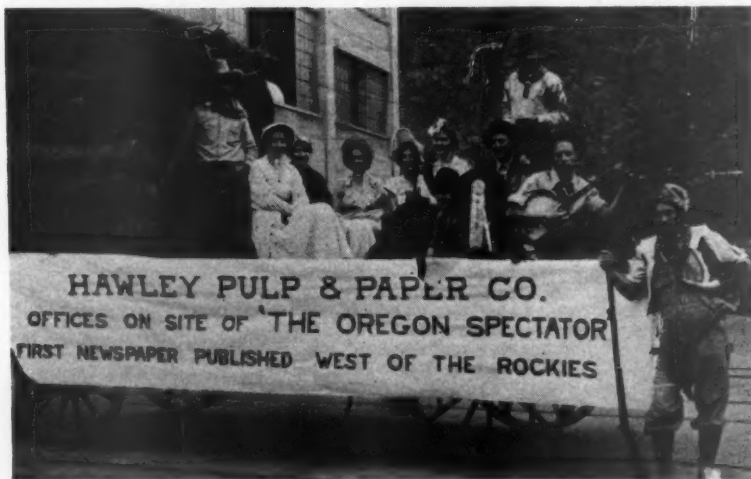
A feature of the celebration was the parade, with a large number of prizes. The grand sweepstakes trophy was awarded to the Hawley Pulp & Paper Co., which entered a float depicting the offices of "The Oregon Spectator," the first newspaper published west of the Rocky Mountains.

For a week previous to the celebration all of the office girls of the Hawley organization wore old time costumes and the men allowed their whiskers to grow, wore red bandanas and black hats, and the balance of the costumes were a cross between loggers clothes and the trappings of frontiersmen. Louis Smith, superintendent of the converting plant, designed the float.

At a later meeting of the Oregon City Chamber of Commerce a cup was presented to the Hawley organization. John Smith, vice president and general manager; Carl E. Braun, mill manager;



In the center is shown the large "Territorial Days" sweepstakes cup and blue ribbon, recent additions to the cups previously won by Hawley Pulp & Paper Company for activities in baseball.



The float of the Hawley Pulp & Paper Company, Oregon City, Oregon, which won the sweepstakes cup at the recent "Territorial Days" celebration in that city.

Martin Lindle, assistant treasurer, and Louis Smith, superintendent of the converting department, represented the Hawley Pulp & Paper Company at the ceremony. John Smith and Carl E. Braun were highly praised for their efforts in helping to make the "Territorial Days" celebration such a success and the wonderful spirit and cooperative zeal of the entire Hawley organization was commended. Mr. Smith proposed to make the trophy a permanent feature of the "Territorial Days" annual celebration and to defend it against all comers in the future.

POWELL RIVER COMPLETING IMPROVEMENT

Powell River Company's program for the improvement of quality of its newsprint will be completed sometime this month, according to company executives. Most of the work was completed during the past summer, and the new blending tanks were installed some six weeks ago. During the Labor Day lay-off slices were installed on No. 5 and 6 machines. What remains to be done consists chiefly of minor adjustments. Cost of the program has been about \$500,000, although no actual expansion of the mill's capacity was involved. The keenly competitive market of the past year, however, made it worth while for the company to make the improvements at this time to maintain its sales. Powell River has been operating right along at top capacity and export sales, except to China, have been satisfactorily maintained.

WHALEN ON COAST

George Whalen, former executive of Whalen Pulp & Paper Company before that concern was reorganized and became the B. C. Pulp & Paper Company, has been in Vancouver recently and is said to have been working on a project to establish a pulp mill near New Westminster, financed by English capital.

Market conditions the world over are so uncertain and the immediate outlook for sales in the Orient, British Columbia's most promising territory under

normal conditions, is so obscure that investors seem chary about financing of new pulp and paper enterprises at this time. A sufficient number of enquiries have been made recently, however, to indicate that as soon as conditions become more stabilized several important new projects may get under way.

TO DELIVER LECTURE

Believing that Oregon and Washington are on the verge of a substantial industrial development as a result of the construction of the Bonneville Dam, the Oregon state system of higher education has arranged an extension course on "Oregon Commerce & Industry" to be given on Friday nights at Lincoln High School in Portland. The "faculty" for this course has been selected from industrial leaders. George P. Berkey, vice president, Crown-Willamette Paper Company, Portland, is scheduled to give a lecture on pulp and paper.

BOX MAKERS ELECT OFFICERS

C. A. Morgan of the F. C. Stetler Manufacturing Co., Portland, Ore., was elected president of the Pacific Coast Paper Box Manufacturers Association at that organization's twenty-first annual convention held at Del Monte, Calif., Sept. 9-11. Charles Ruble of the Standard Paper Box Corp., Los Angeles, was elected vice-president and F. C. Kewell of the Western Paper Box Co., Oakland, was named treasurer. Hugh Peat, San Francisco, was returned as secretary.

This association is divided into two sections, the folding box and the set-up, and the executive committee of each was named as follows:

SET-UP—J. C. Scully, Puget Sound Paper Box Co., Seattle and W. H. Kewell, Los Angeles Paper Box Factory, Los Angeles, Calif.

FOLDING—W. H. Thomas, Fibreboard Products, Inc., San Francisco; C. E. Ridgway, Ridgway Lithograph Co., Seattle, and F. M. O'Leary, Eureka Paper Box Co., Los Angeles.

Mr. Ridgway was declared the association golf champion for the year when he won the first flight in the convention tournament. Winner of the second flight was Howard P. Beckett, commissioner of the National Paper Box Association, out from Philadelphia, and the third flight champion was Cort Majors, Fibreboard Products, Inc., Los Angeles. Winners of the "defeated fours" flights were: first, Richard Schmidt, Jr., Schmidt Lithograph Co., San Francisco; second, Aubrey Sweet, Pacific Straw Paper & Board Co., San Francisco and, third, H. H. Zellerbach, Zellerbach Paper Co., San Francisco.

MONTANA PAPER MILL PROPOSED

Among the last minute PWA applications filed with State Director V. H. Walsh, of Helena, Mont., was application for a loan for \$2,000,000 to build a pulp and paper mill at Polson, Mont. The application was filed by a special committee of the Polson Chamber of Commerce, the committee being headed by State Senator E. E. MacGilvra. The proposal is to erect a 100-ton plant, to be operated by a non-profit organization working for the benefit of the community.

Lester Remmers of the Crown Willamette Paper Co., Los Angeles, returned early in October from his vacation, which he spent in Northern California among the big redwood trees.

A STUDY OF THE RELATION BETWEEN THE CHEMICAL AND PHYSICAL CHARACTERISTICS OF REPRESENTATIVE TYPES OF PULP

By GEO. H. MCGREGOR*

PART I

ABSTRACT

A comprehensive study has been made on the relationship between pertinent chemical constants and significant physical properties of representative paper making pulps. Three standard type pulps such as Blue Denim, rag, Alpha and Mitscherlich pulps were degraded to definite degrees of cuprammonium viscosity by means of the three degrading influences to which paper pulps are usually subjected in their process of preparation such as acids, bleach, and heat. The pulps were degraded under definite conditions of time, temperature, and concentration to viscosities representing two-thirds, one-half and one-third the original value. Physical and chemical properties of the pulps were then determined by standard methods. The relationship noted throughout the experimental part of this paper point to the fact that: 1. Degradation of pulps can be followed by the cuprammonium test. 2. There appears to be a definite relation between viscosity and fold quality of various types of pulps. 3. Relation between physical and chemical properties of pulps and degrading influences is specific in nature. 4. It would appear that acid causes least degradation of cellulose, bleach next, and heat the greatest change in given qualities.

A comprehensive survey of the literature of the subject is offered along with a detailed discussion of latest concepts of cellulose structure.

INTRODUCTION

Considerable has been written on phases of that exceedingly pertinent subject, notably the relationship between the chemical and physical characteristics of various types of pulp. The influence of various reagents or conditions of treatment has been extensively studied in their relationship to the resulting properties of the ultimate product.

Of fundamental concern to the pulp and paper manufacturer is the preparation of three major representative pulps, rag, half-stuff, purified wood pulp or Alpha pulp, and regular bleached Sulfite pulp. In the normal preparation of each type the fundamental basic substituent, cellulose, is subjected to more or less drastic conditions which tend to alter, in one respect or another, the chemical stability of the unit resulting in an ultimate product inferior in varying degrees to that which might be characterized by pure cellulose.

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In the field of rag half-stock preparation and fine rag papers the cellulosic material is usually subjected to an alkaline digestion at about forty pounds pressure in order to remove fats, waxes, resins and other contaminating extraneous materials. Subsequently, the somewhat purified cellulosic material is subjected to a bleaching action by means of calcium hypochlorite bleach, usually at a low concentration of bleach liquor, in order to provide a material as white and bright as is commercially feasible. Other oxidizing agents are occasionally utilized in the numerous methods of purification of the half-stock. Many mills use sulfuric acid to brighten the product at the end of the bleaching operation.

In the normal sizing of various papers a pH on the acid side is usually maintained. Such an acidic condition must ultimately exert its influence on the fiber.

Cellulose is likewise subjected to heat during the digestion; in some instances to a slight steaming preparatory to the bleaching operation, and during the passage of the paper or pulp web over the hot cylindrical dryer section of the paper or pulp machine.

In the manufacture of purified wood pulp, the fibers are usually subjected to very drastic treatment, involving the use of high temperature and pressure digestion, strong sulfite acid treatment, purification by means of chlorine and calcium hypochlorite, usually low pressure

alkaline digestion, and finally direct heat in the drying process. The original material is thus modified so that certain of the less stable components are removed and the chemical constants indicate a purer product. At the same time, the physical properties of this product differ in a marked degree from that of regular bleached pulp.

Cellulose in the form of sulfite pulp, likewise undergoes extreme conditions of degradation including high temperature digestion, fairly concentrated sulfite cooking acid, purification by bleaching, and heat treatment in drying.

Thus, in the usual preparation of these three representative cellulose products used in the manufacture of paper, the cellulose chains and the fiber structures undergo a series of treatments or operations so that one marvels at the high degree of purity of the resultant product. It is hardly conceivable that such action would not in some manner or other affect not only the chemical characteristics, but also the physical properties of the fiber. Whether such physical changes may be followed universally by some one chemical characteristic has never been demonstrated, but has been rather widely assumed in the widespread use of chemical tests for following pulp characteristics.

A survey of present day concept of the fundamental structure of the cellulose unit and the possible avenue of attack by various degrading agencies on this unit might assist in formulating a picture of the probable behavior of cellulose and the fiber to the various conditions to which it is subjected.

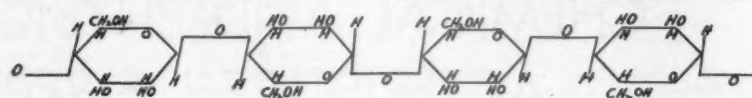
Perhaps no phase of the development of the Pacific Coast pulp and paper industry is more important than a more comprehensive knowledge of the characteristics of types of pulp. Therefore Pacific Pulp & Paper Industry takes special pleasure in presenting herewith the first installment of a study of the relation between the chemical and physical characteristics of representative types of pulp by Geo. H. McGregor. In the various chapters there will be presented an historical survey, a statement of the problem, a discussion of methods, a description of the experiments and the effect of various treatments on the standard stocks, a general summary and conclusions. — Editor.

As a chemical unit, cellulose is classified as a complex polysaccharid possessing the general formula $(C_6H_{10}O_5)_n$. This chemical material is found in a regular structural arrangement in the fiber, either of cotton, wood, linen, etc. The fiber is recognized as an organized assembly of related units. A rather clear cut picture has been formulated by Ludtke (1) and summarized by Weil (2) as follows: The central canal of the fiber is commonly called the lumen, this unit being surrounded by the tertiary lamella, a skin substance of furfural character. These secondary lamella composed of cellulose units are arranged in layers over the lumen and are divided by concentric rings of skin substance. These secondary layers seem to be separated longitudinally by the skin, into strips which are wound spirally around the axis of the fiber. The inner layer strip, that is the one nearest the lumen, is nearly parallel to the axis of the fiber and, as the strips extend outward, they assume a smaller pitch until on the outer layer they are assumed to be wound directly around the circumference of the fiber. In this manner the inner layers contribute strength in the long direction, and the outer layers impart stability to the entire fiber. The individual strips are presumed to be made up of fibrils whose morphology is somewhat questionable. In addition the fibrils are separated transversely by fine skin-like substance, also probably of furfural character, into small fusiform bodies (3). These small units are presumably the smallest building elements of the fiber surrounded by the skin-like covering. The chief chemical component of the fibrils is cellulose; the skin-like substance on the other hand is probably furfural in character. The entire unit is encased in the outer or primary lamella, of skin-substance intimately associated with the transversely wound outer fibrils of cellulose.

The fusiform bodies, or crystallites, are made up of long chain molecules of cellulose of molecular weight approaching 400,000. These chains are associated in parallel arrangement, spaced regularly so as to form the cellulose crystal cell. The unit cell of the crystal is assumed to be composed of four glucose units, the size of the crystal being of the order of ten Angstrom units by eight Angstrom units by eight Angstrom units.

Numerous investigators have studied the structure of the fundamental unit or micelle. Meyer and Mark (4) in their extensive X-Ray researches consider the fundamental unit of structure of cellulose to be the micelle, in which a great many large molecules are maintained in ordered arrangement by the secondary valences of their hydroxyl groups. Lewis (5) offers a concise yet complete review of the subject of the structure of cellulose, especially the detailed work of Staudinger and Schweitzer (6) on high polymeric compounds with especial reference to the size of the cellulose molecule; Carothers' (7) detailed work on polymerization, and the molecular weight of cellulose and Katz' (8) work on researches relating to X-Ray spectroscopic investigations concerning the character of the swelling of substances which give a fibrous diagram. In this review he states that "cellulose may be considered as consisting of long polymeric chains of amylene oxide anhydro-glucose rings, the structural units of which are held together by means of acetal linkages between the No. 1 carbon of the one ring and the No. 4 carbon of the

next ring. The second ether bridge of the acetal linkages being possibly of the ring closure and possibly of the beta-glucoside type, and further indicates the following structural formula for the cellulose chain.



"The old picture of a molecule as an entity of unchanging weight and size does not hold with polymers like cellulose. Molecular sizes are average. Long and short chains are mixed and any possible molecular weight values would represent only an average figure of all the chains present. With this picture for cellulose structure we can classify reactions according to those affecting primary valence linkages on the one hand and secondary valences linkages on the other. In certain cellulose reactions both types of change occur. Under certain conditions the secondary valences are first attacked, resulting in physical depolymerization, followed by reactions involving the primary valences. As a rule the intermolecular reactions are the first to take place, resulting merely in a decrease in micelle size. Subsequently occur chemical reactions that alter the units. Acetal linkages joining anhydroglucose units are hydrolyzed; the length of the chain is altered."

In the normal preparation of rag, Alpha, and sulfite pulps a certain degree of degradation is almost certain to occur. Early stages of degradation, therefore, probably cause micellar splitting, followed by chemical depolymerization.

In the cellulose chain molecule as usually listed, the following main structural feature are evident.

1. Primary alcohol groups
2. Secondary alcohol groups
3. C-H linkages
4. Acetal formation
5. Hemi-acetal formation
6. Amylene oxide ring structure

Cotton cellulose of the structure $(C_6H_{10}O_5)_n$ contains three alcoholic hydroxyl groups for each six carbon atoms as is shown by the formation of its trimethyl and triacetate derivatives. Complete hydrolysis results in the formation of glucose. Acetolysis yields cellobiose octaacetate and glucose penta-acetate. Methylation and hydrolysis result in the formation of the definite compound 2, 3, 6, trimethyl glucose.

The alcoholic nature of the cellulose micelle can readily be attested by the following reactions common to the aliphatic alcohols, alcoholate formation, ester formation, ether formation, and oxidation with consequent formation of aldehyde and acid.

Cellulose reacts with NaOH in the ratio of one NaOH to two $C_6H_{10}O_5$ groups. Cellulose ester formation takes place by the action of nitric acid on cellulose with the predominant formation of the trinitrate. Cellulose also forms esters with sulfuric acid. The composition of the ester is dependent on the concentration and time of contact and on the temperature of the acid. The formation of the acetate has already been mentioned.

Cellulose ethers may be formed by the same methods that are used for aliphatic alcohols; namely, (1) through action of alkyl halides upon alcoholates and (2) by the action of esters upon alcohols, dimethyl sulfate being used.

In the usual reactions involving cellulose and acids or alkalis or heat there is undoubtedly a certain amount of degradation of the cellulose with consequent depolymerization, aldehyde, and acid formation. Oxidation usually results in the formation of simpler products of an aldehyde nature as evidenced by increased reducing properties and some acidic formation. The action of acids result in the formation of the so-called intermediate products hydrocellulose, and finally glucose. In either case it is nearly impossible to obtain uniform intermediate products, the hydrolysis failing to stop at any one point or at the formation of any one group of compounds.

The carbon hydrogen linkage under rather drastic circumstances may split with the formation of smaller sugar units. The acetal structure of the molecule may be easily hydrolyzed and the hemi-acetal structure more so. The amylene oxide structure may be altered to form sugar units of less complexity.

Thus the degrading influences of heat, acid, and bleach find an active point of contact with the cellulose micelle.

This research embodies an attempt to follow the effect of the above mentioned degrading influences under given conditions on the physical and chemical properties of the cellulosic materials represented by a high grade rag half-stuff, a commercial Alpha pulp, and a regular bleached Mitscherlich sulfite pulp.

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(To be continued in November)

BAILEY AWARDED FELLOWSHIP

A. J. Bailey, graduate student, College of Forestry, University of Washington, Seattle, has been awarded a Charles Lathrop Pack fellowship to make an investigation into the location of lignin and cellulose in Douglas fir.

NEWSPRINT and FOREIGN TRADE

By W. F. McCann, Shelton Local 161,
International Brotherhood of Pulp,
Sulphite and Paper Mill Workers.

There seems to be a fallacy among a large number of our American people both in business and among wage-earners, that the so-called prosperity of 1929 was brought about by our exports. Nothing can be further from the truth and at no time have they exceeded 10 per cent of our ability to produce.

The truth of the matter is, that the prosperity of 1929 was false and brought about by extended credit both home and abroad. If you will recall a decade or so back, it was not easy for a man working for a small salary to go into a business establishment and load himself up with four or five hundred dollars' worth of merchandise with only \$10.00 to his name, yet that is the very thing that did happen from the year 1900 and up. Credit was made so easy for the average wage earner that he bought everything that his household would hold and a lot of things he did not need, due to highpower salesmanship.

About 1930 the entire country was loaded up to what we might call the saturation point of his credit and the man who sold him a bill of goods on credit might be the last to get paid. While this was happening at home, the same thing was happening abroad.

We had loaned them in Europe something like \$20,000,000,000 dollars and they began to buy some of our own securities, with our money which our bankers had loaned them, so there wasn't anything left but to let the credit structure collapse, as there was nothing to be gained by giving them further credit.

Now to get close to home and the paper industry. Some of these same bankers are trying to retrieve their losses by having the tariff rate lowered below the American standard of production, so the foreign producers can ship their paper and pulp to this country, that the bankers may get at least the interest on the loans they made and which they know are bad, the results are, the American paper mills and other manufacturing concerns depending on them are shutting down while we import our paper and make the foreign industry prosperous.

I do not think the American banker is so short-sighted as not to be aware of what is taking place. When we take the fabulous prices charged to the foreign countries during and after the war, if the banker got interest on 60 cents of every dollar he loaned, he could not possibly lose anything. It does not take a mathematician to figure that the amounts charged to the various foreign countries in a large number of cases, was beyond their power of payment, and that they have no intention of paying, and further a larger number of their financial institutions in this country have been reorganized, or been taken over by some other concern, and the little fellow who had his money in them will never get a dollar back. So, why wreck our entire industrial development that a few bankers may get richer?

The paper manufacturers have spent considerable time and money in compiling data and have put them in the hands of the powers that be.

We, the employees of the Northwest paper mills have done our little bit, and

I can see some results of our work. I believe if we get down to work, solicit that aid of the different manufacturers who derive a large portion of their income from the paper industry, and the various civic clubs, and get a real live organization out on this, we can get results.

This bla-bla by some of these newspapers and magazines about foreign flags and what not, when their own magazines and papers are printed on 90 per cent of foreign paper, gets my angora. We are now saddled with a debt of \$200 per head as the result of our foreign policy which was done on worthless paper, so why go further with this nonsense. Here are a few facts and figures: in the years from 1914 to 1922 we sold to the world \$49,952,000,000 and in spite of the war, bought \$25,786,000,000 which left the world in debt to us \$24,195,000,000.

In the period from 1923 to 1929 the foreigners floated loans in the U. S. to the amount of \$7,140,000,000 and took this money, our money, and by the exchanges bought our securities and built up a demand bank deposit of \$4,568,000,000.

In 1930 we find ourselves in this position, war debts of \$10,304,000,000 and American investments in foreign plants \$7,767,000,000 and the world owing us for one-sixth of all we have sold in the last twenty years. Is it any wonder that the hyphenated Americans tell us our foreign trade is the way to build up America. Yes, for them and a good way to kill the paper industry along with many others.

SWEDISH UNEMPLOYMENT

From the American Swedish Monthly for August 1935, publication of the Swedish Chamber of Commerce of the U. S. A., we quote the following data on employment and wages:

"The Swedish unemployment figures have now attained the lowest level on record for nearly four years. The latest report shows a total unemployment of only 50,000 as compared with about 100,000 one year ago. In Stockholm the number of jobless is now 4,200 against 9,900 at the corresponding time last year.

"A recent investigation performed by Swedish labor organizations shows that in the wood-pulp industry of the Sundsvall area, the principal wood-pulp manufacturing district of Sweden, during the period from 1929 to 1934 the production has risen by 31.4 per cent while the number of workmen decreased by 7.4 per cent, and the wages by 13.4 per cent."

CANADIAN PULP EXPORTS SHOW 6 PER CENT INCREASE IN FIRST SEVEN MONTHS

Exports of wood-pulp from Canada this year are running somewhat in excess of last year. According to official figures issued by the Dominion Bureau of Statistics, exports of pulp of all kinds—mechanical and chemical—from Canada to all places during the first seven months of the current year amounted to 365,808 net tons, valued at \$15,702,996, compared with 344,483 tons of a declared value of \$14,569,637 in the corresponding period of 1934, an increase in quantity this year of 21,325 tons, or 6.1 per cent.

The Montesano, Washington Viddette published the following editorial on August 22nd:

WORLD ECONOMICS IN OUR OFFICE

A problem in world economics walked in the front door of The Viddette office the other day.

It appeared in the form of a paper salesman, representing a Finnish paper manufacturer.

He offered to sell us newsprint at precisely 56 per cent of the price we are paying for American-made newsprint.

We said we weren't interested, that we live in a paper-producing district, that we believed in doing our share to build this industry, and—

"But Finland is the only nation that has been paying its war debt in full to the United States," the salesman interrupted. "Besides, Finland is a large consumer of Washington apples. Aside from all the money received by the apple growers, much goes to wood plants for box shooks, much for labor. Finland must sell paper if it is to buy apples and pay its debts."

Well, those statements gave us pause. Then he showed us a sample of his paper. It was good paper, as good as most American sheets, better than many.

"And, besides," he said, "there is a considerable difference in cost."

He told us that Hearst, whose papers have led the "Buy American" campaign, is one of the largest customers of the mill he represents. He named many American newspapers using Finnish newsprint.

What's the answer?

We have some good customers in Montesano who allow us a differential of 10 per cent in meeting competition from outside concerns. We appreciate this consideration. But it has never occurred to us to ask a 56 per cent differential.

What is wrong about this picture?

Should we buy Finnish newsprint, or American? Is there a 56 per cent differential in labor costs, in the cost of materials? More than 56 per cent, because thousands of miles of transportation from Finland must be paid for, too.

How long will patriotism stand up against 56 per cent.

LELOFF JOINS PACIFIC SALES COMPANY

O. J. Leloff of Camas has joined the Pacific Sales Company of Portland and is calling on the Pacific Coast Mills in the interests of the company's pulp and paper mill supply accounts, the Draper Brothers, Wisconsin Wire Works, William A. Hardy & Sons and several others.

Mr. Leloff succeeds Carl F. Beyerl, who left to engage in consulting work.

Mr. Leloff is an experienced paper mill operator, having been associated with the Irving Paper Mills, New Haven Pulp & Board, Rhinelander Pulp and Paper Company and the California Fruit Wrapping Mills before coming to Camas where he has performed some special work for the Crown-Willamette Paper Company.

Mr. C. M. Dilley is president of the Pacific Sales Company, whose offices are in the Security Building, Portland, Oregon.

A METHOD

For Converting Sodium Sulphide to Sodium Carbonate In the Recovery of Soda Base Sulphite Pulping Liquor

By P. S. BILLINGTON, Junior Chemist; G. H. CHIDESTER, Associate Engineer,
and C. E. CURRAN, Principal Chemist

Forest Products Laboratory,* Forest Service,
U. S. Department of Agriculture

ABSTRACT

A method of converting sodium sulphide present in the ash obtained from the burning of waste sulphite pulping liquor is described. The method consists of evaporation and burning of the spent liquors followed by treatment with sodium bicarbonate to convert the sulphide formed in burning to carbonate which may be used for the preparation of fresh cooking liquor. A suggested method of application together with a theoretical chemical balance of the process is presented.

INTRODUCTION

In the recovery of soda from soda base sulphite cooking liquors by methods involving evaporation and burning of the liquor, varying quantities of sodium sulphide, carbonate, sulphite and sulphate are present in the ash. The ratio of these constituents depends to a large extent upon the burning conditions. When a solution of this ash is treated with sulphur dioxide the carbonate is converted to bisulphite, the sulphate is inert, and the sulphide is converted to sodium thiosulphate, polythionates, liberating free sulphur. It has been shown at the Forest Products Laboratory that these latter substances interfere with the normal cooking process by converting the bisulphite to sulphate before the pulping of the wood is complete. Hence it is essential that a satisfactory recovery method should render ineffective any sulphide which may be present.

Although many methods have been suggested for the recovery of soda from waste sulphite liquor the fact that the use of soda base liquor is apparently limited to a very few mills which can operate in conjunction with an alkaline pulping process would lead to the conclusion that none of the methods was considered sufficiently economical to warrant its universal adoption. The possibilities which present themselves for eliminating the difficulty with sulphide are the removal of the sulphide from the ash, conversion to the inert sulphate, and conversion to sulphite, hydroxide, or carbonate.

Old Methods of Sulphide Conversion

In the preparation of sodium intermediates considerable work was done during the nineteenth century on the conversion of sodium sulphide to carbonate, bicarbonate, and hydroxide. Thorpe's "Dictionary of Applied Chemistry" con-

tains brief descriptions of many of these procedures and was the source of information here presented.

Process for Converting Sodium Sulphide to Sodium Carbonate

Wilson in 1840 patented a method whereby a solution of equivalent quantities of sodium sulphide and bicarbonate were evaporated to dryness, thus producing sodium carbonate. The passing of carbon dioxide into a solution of sodium sulphide was suggested as long ago as 1860 by Hunt. However, a great excess of carbon dioxide is required. Liermann, in 1878, mixed aluminum oxide with sodium sulphide and passed heated air through the mixture. Sodium aluminate was formed which was decomposed by carbon dioxide to yield sodium carbonate and aluminum hydroxide. Mathiesen and Hawliczek, in 1886, precipitated sodium bicarbonate from a solution of sodium sulphide in a 16 to 19 per cent sodium chloride solution by treatment with carbon dioxide. Ellerhausen, in 1890, patented a process whereby sodium carbonate and ferric oxide were heated together to form "ferrate of soda." Sodium sulphide solutions were filtered through a layer of this material to form sodium carbonate.

Processes for Converting Sodium Sulphide to Sodium Sulphate

Hargreaves injected air into a solution of sodium sulphide thus oxidizing it to sodium thiosulphate. Further oxidation to sodium sulphate was accomplished by the use of sodium nitrate. Pauli in 1870 suggested aerating a solution of sodium sulphide in which was dissolved a soluble manganese salt. The oxidation then goes as far as the sulphate.

Processes for Converting Sodium Sulphide to Sodium Hydroxide

Merle, in 1875, destroyed the sodium sulphide electrolytically. The oxides of such metals as zinc, copper, lead, iron and manganese have been proposed for converting sodium sulphide to the hydroxide and the corresponding metallic sulphide. The treatment of sodium sulphide with the oxides of iron at red heat was suggested in 1778 but found to be unsatisfactory.

Experimental Work

Of the preceding methods, that of Wilson involving the use of sodium bicarbonate gave the most promising results. The following experiments conducted at the Forest Products Laboratory were, therefore, based on this method.

Conversion of Sulphide to Carbonate

I. One kilogram of sodium bicarbonate was mixed with about 500 cc. of water. To this, 760 grams of crushed commercial sodium sulphide (60 per cent sodium sulphide) were added and the whole well mixed. On evaporation to dryness the test for sulphides was negative, sodium thiosulphate was less than 4 per cent, and sodium carbonate was 96 per cent. This residue was used to prepare liquor for the digestion designated S-36 in table 1.

II. The spent liquor from a soda base sulphite digestion was evaporated to about 55 per cent solids and burned with additional amounts of sodium sulphide and sulphate in order to yield a sufficient quantity of ash. The resulting ash contained the following amounts of the various salts:

	Per Cent
Na ₂ S	25.6
Na ₂ CO ₃	29.6
Na ₂ SO ₄	12.8
Na ₂ SO ₃	1.5
Na ₂ S ₂ O ₃8
Insoluble	29.3

Two kilograms of the crushed ash were well mixed with 1,150 grams of sodium bicarbonate and 600 cc. water. The mixture was evaporated to dryness, dissolved in 10 liters of water, filtered, and then used for the preparation of liquor for the digestion designated S-37 in table 1.

III. Two hundred and fifty grams of sodium bicarbonate and 190 grams of commercial sodium sulphide were well mixed and placed on a 100-mesh wire screen suspended in a 4-inch pipe in such a manner that steam could be blown through the mass. The steaming was continued for about 30 minutes until tests with lead acetate paper showed an absence of hydrogen sulphide in the vapors arising from the mixture. The residue contained about 4 per cent sodium thiosulphate and 96 per cent sodium carbonate. Tests for sulphides were negative.

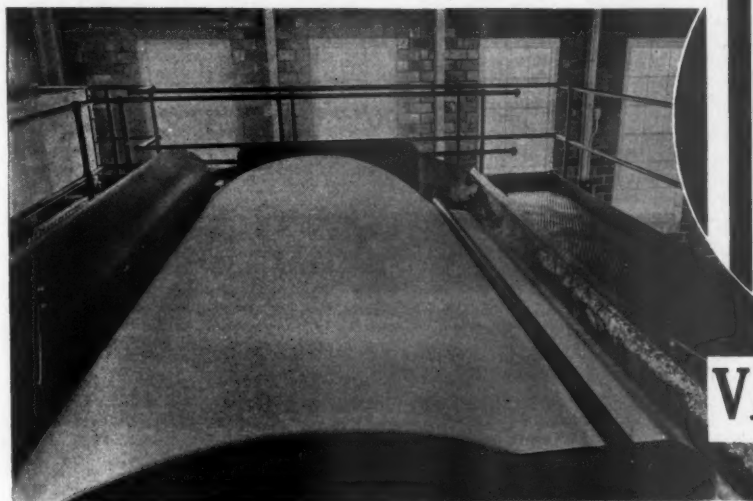
Utilization of the Treated Ash

The liquor for digestion S-36 (table 1) was prepared from equivalent quantities of sodium sulphide and bicarbonate; that for S-37 by treating incinerated waste liquor with a calculated quantity of sodium bicarbonate.

The equivalent of 12 pounds of oven-dry western hemlock and 8 gallons of liquor were used for each digestion. The total sulphur dioxide content was 5.0

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per cent, and the combined sulphur dioxide 1.2 and 1.5 per cent, respectively, for each digestion. The cooking schedule consisted of a 2-hour penetration period to 110° C. followed by a straight line rise to 148° C. in 8 hours with a maximum pressure of 75 pounds. The yield, color and strength of the pulps are indicated in table 1.

The digestions proceeded in a normal manner, and the pulps were in every respect as satisfactory as those cooked in a liquor prepared from commercial caustic soda and sulphur dioxide.

Application of the Conversion Method

The following shows the manner in which the foregoing conversion method might be used in a recovery process.

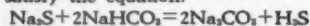
Step 1.—The spent liquors are evaporated to about 55 per cent total solids, the heat for the evaporation being obtained from the next step.

Step 2.—The concentrated liquors are sprayed into a furnace where they are burned. If a waste heat boiler is provided the heat produced should be sufficient to evaporate the spent liquors in step 1, to furnish heat for step 4, and possibly to furnish enough steam for cooking.

The ash consists essentially of the sulphate, sulphite, sulphide and carbonate of sodium, the quantitative composition depending to a large extent on the furnace conditions. If these conditions are similar to those obtaining in kraft liquor recovery the composition of the ash will be quite similar.

Losses of sodium may be replaced with sodium sulphate or sodium carbonate. If sulphate is used it would be introduced into the furnace, while if the carbonate is used it is perhaps better added in step 5.

Step 3.—After solidification the ash is ground or crushed to such a size that it will pass a four-mesh screen. A coarser ash tends to inhibit the reactions in step 4. Either during or immediately following the crushing the ash is mixed with sodium bicarbonate in sufficient quantity to satisfy the equation.



The bicarbonate used is prepared in step 6. It should contain about 50 per cent moisture to react most favorably with the sulphide. Less moisture requires either a higher temperature in step 4 or a higher ratio of bicarbonate to sulphide. Moisture contents in excess of 50 per cent do not facilitate the reaction and require more heat to evaporate the water.

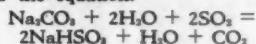
Step 4.—After thorough mixing of the bicarbonate and ash the mixture is either heated at a temperature above 200° C. or treated directly with steam at atmospheric pressure in a suitable apparatus. The reaction which occurs here is described in step 3. The hydrogen sulphide eliminated may be conducted to the sulphur burned and burned to produce sulphur dioxide to be used in step 7.

Step 5.—The mixture, obtained from the heat or steam treatment, is dissolved in the minimum quantity of water and the insoluble materials separated by settling or filtration. The clear solution consists essentially of sodium carbonate. If sodium carbonate is to be used to replace losses of soda it can well be added at this point.

Step 6.—Carbon dioxide is passed into the concentrated solution of sodium carbonate and a sufficient quantity of the precipitated bicarbonate removed to be used in step 3. The carbon dioxide is obtained from step 7.

Step 7.—The solution of carbonate and the excess bicarbonate is diluted and sul-

phited, the sulphur dioxide being obtained in the usual manner. During sulphiting, carbon dioxide is freed according to the equation.



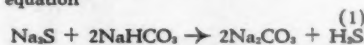
and is utilized in step 6.

Chemical Balance of the Process

The following theoretical considerations are based on one kilogram of an ash of the following chemical analysis:

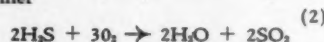
Na ₂ S	20.0 per cent
Na ₂ CO ₃	65.0 per cent
Na ₂ SO ₄	7.0 per cent
Na ₂ SO ₃	1.0 per cent
Na ₂ S ₂ O ₃	1.0 per cent
Insoluble	3.0 per cent

To satisfy the requirements of the equation



431 grams of sodium bicarbonate are required to yield 544 grams sodium carbonate and 87.2 grams of hydrogen sulphide.

If the hydrogen sulphide from (1) is recovered and burned in the following manner



there will be available 164 grams of sulphur dioxide for sulphiting later.

The composition of the treated ash will be as follows:

Na ₂ CO ₃	90.9 per cent
Na ₂ SO ₄	5.3 per cent
Na ₂ SO ₃	0.76 per cent
Na ₂ S ₂ O ₃	0.76 per cent
Insoluble	2.3 per cent

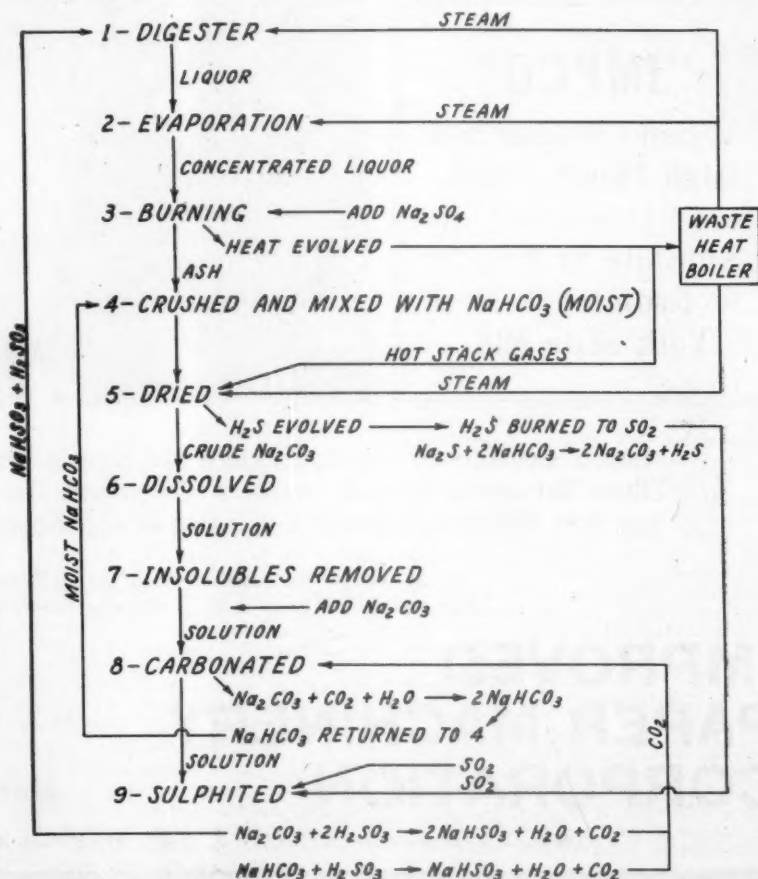
The treated ash is dissolved in the least amount of water necessary and the insolubles removed by filtration or settling. The solution is then carbonated to precipitate 431 grams of sodium bicarbonate. That this quantity of bicarbonate will be considerably less than the total amount available is seen from a theoretical consideration of the reaction expressed as $\text{Na}_2\text{CO}_3 + \text{H}_2\text{O} + \text{CO}_2 = 2\text{NaHCO}_3$. Hart, Baker and Purcell² have developed the following equation

$$\frac{x^2 C^{1.20}}{\text{SP}(1-x)(185-t)} = 10$$

where x represents fraction of sodium as the bicarbonate; c, sodium normality; t, temperature (centigrade); S, solubility of CO₂ at t°; P, partial pressure of CO₂ in atmospheres. Although the constants are developed only for sodium normalities between 0.5 and 2.0, if the equation is assumed to hold for nearly saturated solutions of carbonate then x equals approximately 0.7.

The accuracy of this fraction (0.7) is checked fairly well by Hoffman³ who reports that when a solution containing 256 grams per liter of a solute consisting essentially of 70 per cent sodium carbonate and 17 per cent sodium sulphide is carbonated, crystallization of bicarbonate occurs when from 15 to 25 per cent of the carbonate is converted to bicarbonate and may be continued until 25 per cent of the carbonate remains as such. In other words 75 per cent of the carbonate

²Ind. Eng. Chem. 25, No. 5, 528-31 (1933).
³U. S. Patent, 1,915,315 'Recovery of Waste Liquors.'



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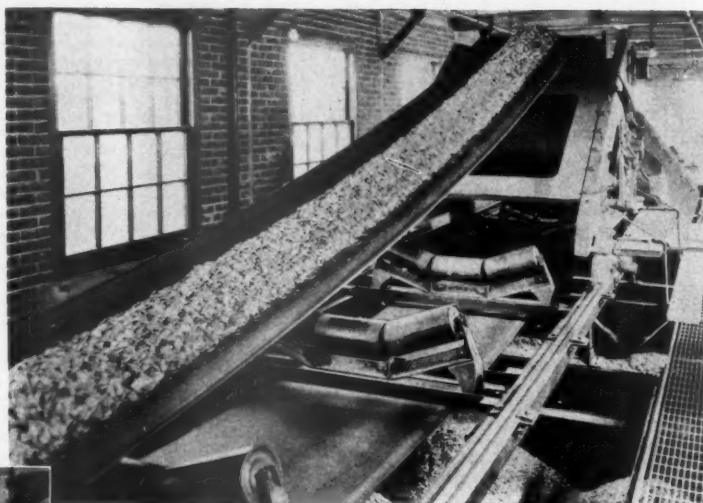
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Right: 36" Link-Belt Anti-Friction Belt Conveyor with Link-Belt Tripper handling chips over Digester Bins.

Lower: Link-Belt SS-124 Steel Roller Chain Drive, operating Hogged Fuel Conveyor.

Circle: Double Strand of Link-Belt > RIVETLESS < Heat-treated Chain used on Hogged Fuel Conveyor discharging either to storage conveyor or boiler house conveyor.

Bottom: General view of sawmill where timber is cut from logs before it goes to the chipper building to be made into chips. This mill is entirely equipped with Link-Belt Malleable and Roller Chain.



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NEW LOS ANGELES ZELLERBACH PLANT

Construction of the new warehouse, office building and distributing plant for the Zellerbach Paper Co. in Los Angeles is well under way, and is expected to be ready for occupancy about Dec. 1.

Contractors are now framing the roof trusses and will soon have the roof on. The steel work is in, and the concrete has all been poured.

Zellerbach now operates from the main plant at Second and Los Angeles Streets, with three outside warehouses. When the new building is complete, the company will move from the Los Angeles Street building and will close the three warehouses.

The new structure is of reinforced concrete, and will have 200,000 sq. ft. of floor space, all on one floor, giving the company considerable more working area than now available. A feature of the plant will be "straight line production," by which they have applied factory operation of the distributing business. Merchandise coming into the plant will move into storage and on to shipment with a minimum of handling of deviation from straight line movement. A railway spur track will extend the length of the building.

Sawtooth roof construction will give natural indirect light throughout the office and warehouse, with complete elimination of windows below the ceiling line. Supplementary artificial light will of course be provided for use when necessary. The office area will be air conditioned.

Heat will be provided by a low pressure steam heating plant.

The new location at 3000 E. 12th Street, corner of Evergreen, is east of the main downtown section, accessible to all parts of the city. Broad boulevards, with a minimum of stop signals, lead to the building, and a large area of hard surface parking space adjoining the structure eliminates the problem of what to do with the car.

Everyone connected with the Los Angeles division of the Zellerbach Paper Company, from office boy to general manager, is tremendously enthused over this development, made possible through the loyal support of the company's customers throughout the Southern California territory.

Two mistakes in a 35-word story is something of a record! Yet they were made in an item in these columns in the August issue concerning Augustus Johnson paper mill representative, and his lines. It was stated that the Falulah Paper Co. of Fitchburg, Mass., makes bonds, when it makes boards and it was also said the Falulah company bought the Merrimac Paper Co. when the sale was made by the Fitchburg Paper Co.

For 25 years Victor Barr has worked in San Francisco for the Zellerbach Paper Co. Recently he was given a service pin to commemorate his quarter-century service. Mr. Barr sells printing papers.

ZELLERBACH ENTERS KANSAS CITY

Zellerbach Paper Co. has purchased the Lane Paper Co. of Kansas City and will operate it as a company branch, with the former owner, Ralph Lane, in charge. Up to now the Zellerbach paper distributing operations have been confined to the states of the Pacific slope, their farthest eastern branch being at Salt Lake City.

ISLER VISITING MILLS

P. L. Isler, San Francisco, secretary Pacific and Bag Institute of the Pacific Coast, is spending part of October in the Pacific Northwest, visiting mills at Camas, St. Helens, Oregon City and Longview. His headquarters are at the Hotel Benson, Portland.

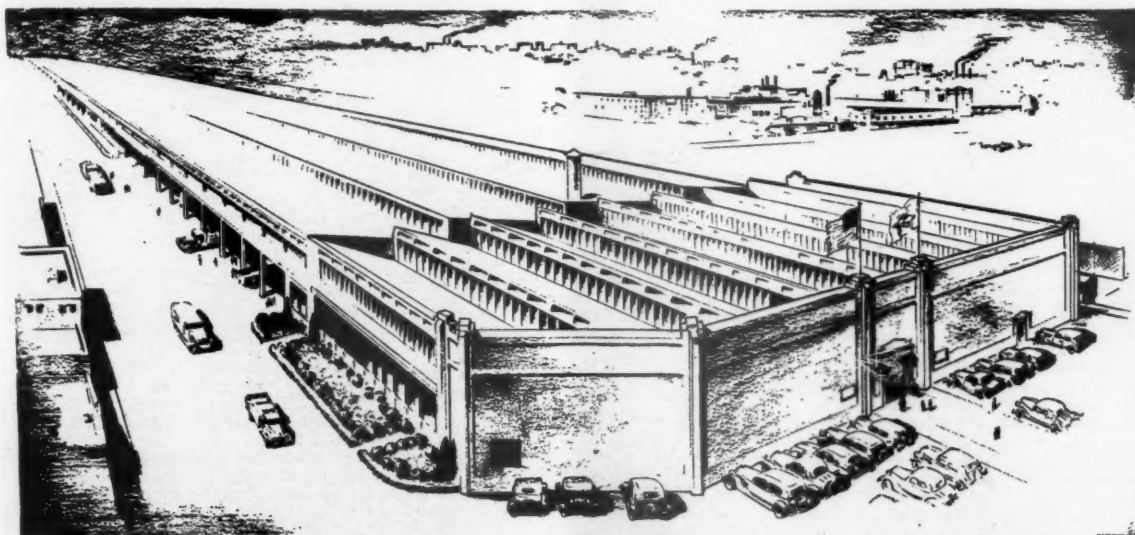
While in the north Mr. Isler also is doing some work for The Paper Bag Manufacturers Institute, a national trade body.

MILL MEN PLAN MEETING

Although plans had not been definitely arranged at the time of writing, the Los Angeles mill men's association was expected to meet at the Terminal Club on Oct. 24 for their semi-monthly business session. The organization has yet to select its official name, and this will probably be done at the October gathering.

Plans are now afoot for the social meeting in November, a barbecue being contemplated for the event.

Los Angeles mill representatives are now in the midst of their holiday specialty, and according to Edward N. Smith, well known mill agent, demand is much better than last year, and 100 per cent better than in 1933.



Architect's drawing of the new Los Angeles warehouse, office building and distributing plant now under construction for the Zellerbach Paper Company.

LARGEST COAST MEETING OF PAPER MEN HELD IN LOS ANGELES

The greatest galaxy of paper mill representatives and paper merchants ever assembled at one time in the West, gathered together September 6th at the Brentwood Country Club near Los Angeles, when the paper mill men of Los Angeles were hosts to the paper distributors of Southern California at the 1935 golf tournament, dinner and high jinks.

The congregation totaled more than 150 men, all directly and intimately connected with the paper industry between the paper mill and the retailer. The representation of the industry was even greater than at the annual paper trade meeting at Del Monte each spring, where the registration is sometimes greater, but includes the ladies.

The mill representatives, who formed a new and active association earlier this year, worked some months on the plan to entertain the jobbers in a manner worthy of their guests. To that end, Lester E. Remmers was appointed chairman of the High Jinks Committee, with Geo. C. Wieman, Charles Spies, S. G. Wilson and S. R. Whiting as assisting committee men.

Through the activities of these men, and the officers of the mill men's group, the affair was programmed in most successful manner, and starting at noon with the first foursome away in the golf tournament, carried through to a bang-up climax with the last act of the evening floor show.

Just after noon on Friday, Frank Philbrook, president of the mill men's organization, teed off with Paul Fouke, Ted Corcoran and George Ward. They were the first of forty-five entries in the great Brentwood classic, vying for a fine collection of worth-while prizes for low net, blind bogey and select nine holes.

At seven that evening, another hundred or so paper merchants and mill men descended upon the club to sit around the festive board provided by the high jinks committee. Following the awarding of the golf prizes and door prizes, the ten-act floor show sprang to life, accompanied by the Santa Barbara Biltmore orchestra.

The smooth working of the whole occasion, exemplified the efficiency of the informal organization headed by Frank Philbrook, with Edward N. Smith and vice-president, Neil B. Sinclair as secretary and G. D. Megel as treasurer. The group is a comparatively new one, yet has avoided many of the usual association complications, and with a few hard-working committees, has accomplished a great deal without confusion.

The Golf Tournament

The golf tournament ended with Bob McCrystal, superintendent of the South Gate plant of Fibreboard Products, Inc., running off with the Class A low net score, and winning a fine fitted leather traveling case. With an 8 handicap, his net was 71, good shooting in any man's league.

In the Class B flight, Arthur E. Kern was tops, also with a low net of 71, but with a 30 handicap. The two classes, as defined by George Wieman when pre-

senting the prizes, include in Class A those who make a business of golf and neglect their work, and in Class B those who attend their business and neglect their golf. Mr. Kern's prize was a russet leather golf bag.

Charles Spies and Wm. Taverner were tied for the Class A selective nine holes. Mr. Taverner won the toss and carried home the gold safety razor. M. J. Boradori and Dick Close were also tied for the Class A blind bogey, a fancy cake dish, and Mr. Close won out on the toss.

Court Majors won the leather st-d case for the Class B select nine holes, and the Class B blind bogey prize, a frosted glass bowl, was taken by Charles Brouse, who claimed he had never played golf before.

Entries in the tournament included Wm. Taverner, Mason Olmsted, Walter Huelat, George Wieman, Frank Philbrook, Ted Corcoran, George Ward, Paul Fouke, Chris Allair, Carl Smith, Carl Thomas, R. H. Buel, R. B. Town, Russell Attridge, J. Madigan, Chas. Brouse, Al Hentschel, A. J. Johnson, I. A. McDaniel, J. W. Genuit, F. D. Smith, C. F. Jenkins, L. J. McGrath, A. A. Ernst, A. T. Storage, M. J. Boradori, W. H. Sumner, Court Majors, R. C. McCrystal, Neil Sinclair, Tom Lyons, W. W. Herrington, B. Reed, S. P. Sprague, W. Z. Voltz, A. W. Fox, Milt Corcoran, R. LeGrant, Carl Fricke, A. E. Kern, Chas. Spies, R. T. Close, Warren Webb, G. A. Marmion and C. Y. Arima.

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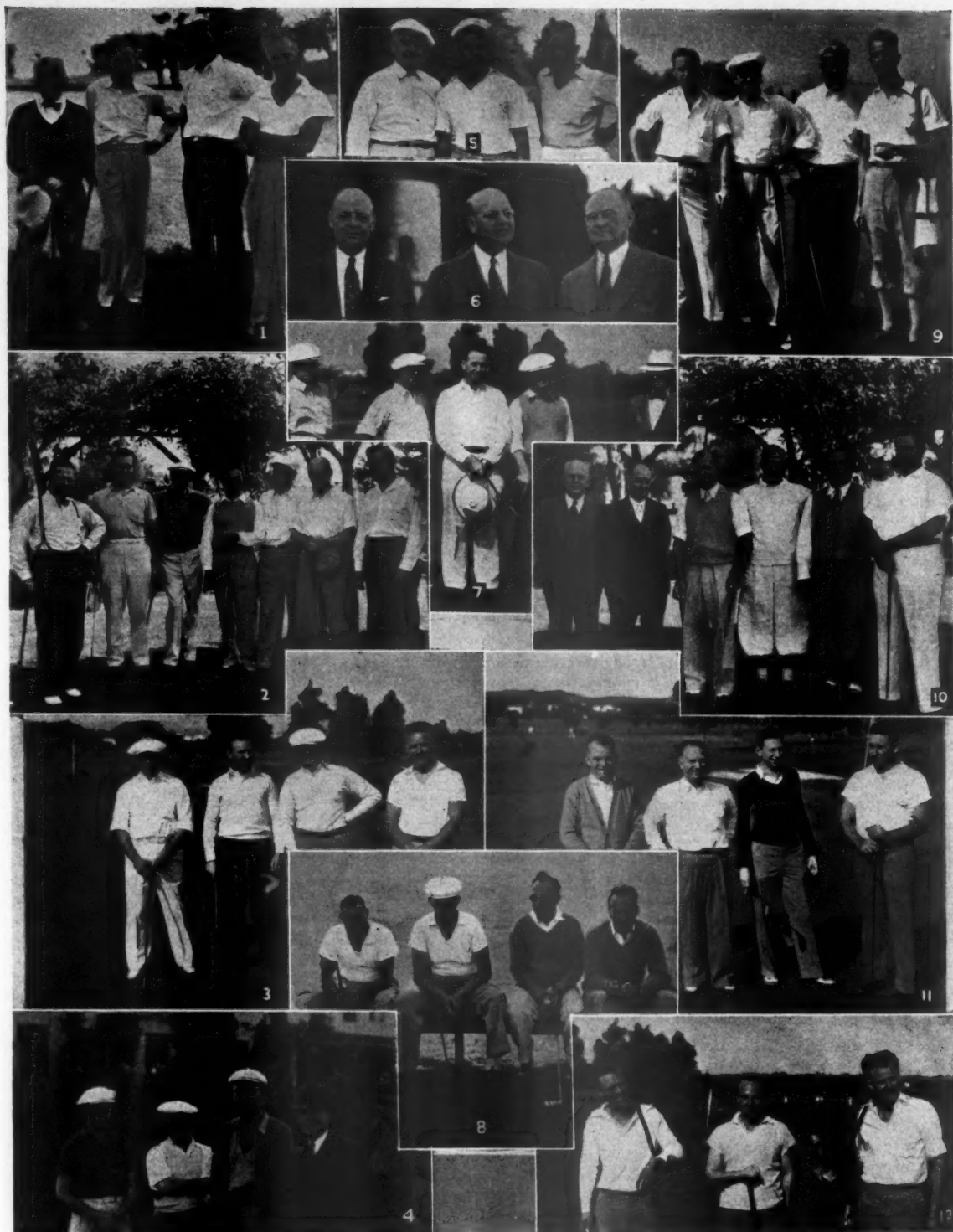
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**GOLFERS AT THE PAPER MILL REPRESENTATIVES-PAPER DISTRIBUTORS
TOURNAMENT, BRENTWOOD COUNTRY CLUB, LOS ANGELES, SEPT. 6TH**

No. 1, Left to Right: R. T. Close, W. E. Webb, L. Curtis, Chas. Spies. No. 2: Chas. Brouse, Court Majors, Russell Attridge, R. C. McCrystal, Al Hentschel, Neil Sinclair, G. N. Madigan.
 No. 3: A. J. Storage, C. H. Thomas, Carl H. Smith, Chris Allair. No. 4: Arthur L. Fox, W. A. Voltz, A. A. Ernst, A. E. Carlson.
 No. 5: M. J. Boradori, Harold Sumner, Tom Lyons. No. 6: Neil Sinclair, secretary; Frank Philbrook, president; Ed N. Smith, vice-president of the paper mill representatives' organization in Southern California.
 No. 7, Paul Fouke, Frank Philbrook, Ted Corcoran, George A. Ward, S. G. Wilson. No. 8: J. W. Genuit, L. J. McGrath, F. D. Jenkins. No. 9: J. A. McDaniels, Walter Johnston, R. B. Town, R. H. Buel. No. 10: Wm. Fricke, Roy E. Banks, Wm. Taverner, Walter Huelat, Geo. Weiman, M. B. Olmsted.
 No. 11: Carl Fricke, R. E. LeGrant, Arthur Kern, Milton Corcoran. No. 12: Wm. Herrington, Bert Reed, C. K. Sprague.

THE MENACE OF THE SMALL ORDER

OR

UNIT MINIMUM SALES CONTROL *

By F. E. JEFFRIES

A few years ago Mr. Schoenbucker, statistician for the National Paper Trade Association, made a very thorough study of the evil of small orders, the actual loss sustained in handling them and the consequent threat to net profits. He suggested that the association members compile records to show the percentage of small orders that were being taken in the various brackets beginning with \$2.50 on up to \$10, believing that this would strikingly reveal the seriousness of the small order problem. Some members may have made the investigation suggested by Mr. Schoenbucker, but, if so, no remedy for the evil has ever been suggested, to my knowledge.

Very serious consideration and study has been given by paper executives to ways and means of increasing net profits and this subject is approached from different angles. For example, last year's report of the Survey Committee refers to the fact that all are busily engaged in "collecting sales" and, of course, sales are the first requisite to success; in fact, the life blood of any business, for without sales there can be no profits. Another approach to the net profit problem was made in the report on the Scientific Mark-Up Plan where it was shown that broken packages must carry a mark-up of 94 percent simply to earn overhead expenses. Still other emphasize closer study of various expense items and operating costs.

Mr. Breyman has still another angle to this subject and one that coincides with my views in certain statistics he has prepared. He has stressed the necessity of "collecting sales" and of a Scientific Mark-Up Plan and of holding operating costs to a minimum, but he uses the unit sale as the basis of a very comprehensive investigation. He finds that a \$7.35 sale breaks even,—that it takes care of the expense but shows no profit, while an \$11.62 sale earns 3 percent net. He qualifies this conclusion, however, by stating that many variable factors must be con-



sidered in determining what constitutes a profitable order.

I have carefully read the minutes of last year's convention. Interesting and instructive papers were read dealing with various subjects and problems, but nowhere could I find any paper, or discussion, or study of this very definite evil—the small order; nor methods to remedy the evil by increasing the size of these orders. The emphasis has been put upon increasing net profits through sales volume, scientific mark-up, reduced operating costs, and so on, but little or no thought has been given to the unit sale and the necessity of the sales organization accepting the responsibility of building up small orders to the point where they will show a profit.

After Mr. Schoenbucker's visit of a few years ago we acted upon his suggestion to carefully analyze our sales and the results were very revealing. We ascertained the percentage of orders in each bracket—\$1.00 to \$2.50, \$2.50 to \$5.00, \$5.00 to \$7.50, \$7.50 to \$10.00, and over \$10.00—for each salesman and for the organization as a whole. Each month, as the figures were prepared, we compared results with previous months and we then determined to enter upon a campaign to lower the percentage of small unprofitable orders. For a period we met with only reasonable success in these efforts. We were not entirely satisfied. We knew there was plenty of room for improvement. So we discussed the matter with the sales

force and arrived at a basis of a minimum sale of \$3.00, below which credit would not be given the salesmen. This worked satisfactorily and two years ago we raised this minimum to \$5.00 per order. Now, what has been the result? The average amount of each sale tag has been increased over this period of four or five years by 25 percent and the number of orders under \$5.00 decreased 26 percent. Better still, our salesmen now realize that this action, which at first seemed somewhat drastic, has resulted to their advantage and certainly the house has every reason to be gratified with the results.

These, you will agree, are very real, very profitable and the question naturally arises "How did you do it?" and "If you can accomplish the results you mention, why has this not been more generally done?" Well, it has been a long, slow process of educating the salesmen to see the desirability of increasing their individual orders which means larger profits both to them and to the house.

I know full well that we cannot expect to eliminate all small orders. This is a goal to work towards but impossible to reach. Of necessity there are accommodation orders that must be taken care of, we cannot get away from it. They come from small buyers and larger ones alike and must receive the same attention as the more profitable orders do. But I maintain, and our experience proves, that we can reduce the number of small orders by careful, systematic work with the sales force, and they in turn with their customers. And, right here let me venture the opinion that if every sales organization—instead of an occasional one here and there—attempted to sell the idea to their sales department, these small-buying customers would be time accept as an established fact the necessity of the larger unit. The work would be so much easier and the results much more gratifying, if all participated in this campaign.

The effort to stimulate the interest of the salesman in this idea of increasing the unit sale extends along a number of lines. Each

*Presented by Mr. F. E. Jeffries of the Tacoma Paper & Stationery Co., before the 18th Annual Convention of the Pacific States Paper Trade Association, Del Monte, California, May 9th and 10th, 1935.

QUESTIONNAIRE — UNIT MINIMUM SALES CONTROL

Summary of Replies Received from 37 Out of 45 Members

—Statement of Orders Taken by Routes—

Route No.	Orders					Total	Percentages					Per Tag	
	To 2.50	To 5.00	To 7.50	To 10.00	Over 10.00		To 2.50	To 5.00	To 7.50	To 10.00	Over 10.00		
1	1	4	13	17	54	89	1.1	4.5	14.6	19.1	60.7	100%	31.27

Questions:

1. Do you keep monthly records of numbers of orders running from \$2.50, \$5.00, \$7.50 and \$10.00 by Sales Routes as shown above?
2. Also percentages of orders by Sales Routes as shown in above brackets?
3. Do you keep monthly record of average amount of Sale Tag as shown above?
4. Do you give salesman credit for all business off his territory?
5. Do you give salesman credit for all orders under \$5.00 off his territory?
6. Do you pay salesmen flat salary?
7. Do you pay salesmen salary and commission on Gross Sales?
8. Do you pay salesmen on straight commission based on certain percentages of Gross Profits?
9. Do you promote sales contest in which only orders in the profitable units are tabulated?

Replies:

- 1—Yes; 35—No.
- 2—Yes; 34—No.
- 5—Yes; 31—No.
- 35—Yes; 2—No. Of the 35, 7 say "With few exceptions"; 2—"Credit for assigned accounts only".
- 35—Yes; 1—No.
- 24—Yes; 10—No. Of the 24, 19 say "Some"; 1—"Plus commission on net profits"; 1—"Plus percentage on gross profits".
- 15—Yes; 18—No. 1—"Commission paid on profits"; 1—"Some"; 1—"Drawing accounts; end of year bonus on percentage net profit".
- 18—Yes; 17—No. Of the 18, 2—"Some"; 1—"Drawing account; end of year bonus on percentage net profit".
- 6—Yes; 30—No.

month he is shown his average sale, the percentage of sales in different brackets, how they compare with previous months and with the organization as a whole. He is commended for his work, should it be satisfactory, or encouraged and shown how to improve should he have fallen down. At intervals sales contests are put on in which only orders amounting to \$10.00 or more are counted for points. Constantly new items are sought for, that the salesman can use in building up his individual order, small items usually that show a very satisfactory profit and that can be handled by the small buyer. He is encouraged to approach the small-buying customers showing them that the small orders of, say, less than \$5.00 which they "favor" him with each week, or really not a favor because delivery costs, handling charges of various kinds, time and labor in calling and overhead expenses, more than eat up the profit, whereas, if the calls could be confined to one or two a month instead of four, and if orders sufficient to take care of the requirements for a longer time were given, all would benefit—the customer as well as the salesman and his house. The customer's time would be conserved by less frequent calls from salesmen. Then, too, the alert, resourceful salesman can show his customer the advantage of limiting his purchases to fewer supply houses, thus making his business more worth while to those from whom he does buy and entitling him to better service and better credit accommodation. No

doubt many other arguments will suggest themselves to your mind.


Many times it has been noted in the office as the orders go through that a sale would total between three and four dollars possibly has been increased to over five dollars by the addition of some one or more items. In these cases the salesman has put real constructive effort into the sale, building it up to the point where it showed a profit to himself as well as to the house, rather than have it fall below the \$5.00 minimum. This is being done, I can safely say, many times every day and in the aggregate it helps to spell profit instead of loss.

Your salesmen are what is known as the shock troops on the front line in the battle of the world's business and if they are actuated with a high vision of the importance of their place as ambassadors of business, if they are not content merely to "collect orders" but use their sales ability in a really constructive, progressive way in keeping with the times, then business itself will reach greater heights of commercial glory.

Let me attract your attention to the article entitled "The Challenge of Today's Market" by Mr. Kenneth M. Goode in proceedings of the last annual convention of the National Paper Trade Association.

In conclusion let me say this subject is presented to you with the hope that it may initiate and encourage the study of this very real menace—the small order—and if it does this, it will have served its purpose.

Frank Gladden, Pacific Coast manager for the Continental Paper & Bag Co., left Los Angeles the latter part of September for New York, where he spent a week at the company's offices before returning to the West.



PUGET POWER
says.

"Will Somebody
kindly tell me why the Federal government imposes a 3% tax on the residential, farm and commercial business of the power companies while so-called public (political) power operations are specifically exempt from this tax? Injustice here is thy sting. This one tax alone cost us \$224,995.53 in 1934."

PUGET SOUND POWER & LIGHT COMPANY
"To best serve the public interest"



**A Hint That
Can Be Converted
Into Dollars**

Mount your wet end on anti-friction bearings, balance and realign your couch, press and felt rolls. That is one way to prolong the life of your felting.

Another way is to adopt the make and weaves of felting that will best meet your requirements.

Then, and not until then, will you begin to get those extra days of service per felt—and lower still further the moisture content of the sheet before it passes on to the dryers where the moisture that remains has to be steamed out at higher cost.

The make of felts most likely to serve you longer and do the most thorough extracting job is the Orr.

Next time you buy felts, specify Orr.

**The ORR FELT and
BLANKET CO.**
PIQUA, OHIO

Pacific Coast Representative: WALTER S. HODGES
414 Terminal Sales Bldg., Portland, Oregon

SCHADT TRANSFERRED TO SAN FRANCISCO

Ray J. Schadt has been transferred from the technical control department of the Crown-Willamette Paper Co. at Camas to San Francisco to become assistant to M. A. Backus, assistant executive vice-president of both the Crown-Willamette Paper Company and the Crown Zellerbach Corporation. Mr. Schadt has been at Camas for two and one-half years and previously worked with the Hawley Pulp & Paper Co. at Oregon City, Ore. At San Francisco he succeeds Malcolm Otis, who has become assistant mill manager of the firm's West Linn plant.

PROCESSING PAPER TAX LITIGATION

Federal Judge John H. McNary, Portland, has granted orders to show cause for temporary injunctions in the cases of the Hawley Pulp & Paper Co., Oregon City, Ore., and the St. Helens Pulp & Paper Co., St. Helens, Ore., versus James W. Maloney, United States collector of internal revenue in the Portland district. The cases concern the processing tax on paper under the agricultural adjustment act.

Judge McNary refused to hear arguments of law because his decisions would only be appealed and furthermore a case of a similar nature is already on its way for decision by the supreme court. The two paper companies were ordered to deposit the amount of the tax in question in a bank and give bond to the government so that in case the supreme court decision is favorable to the government, it will lose nothing.

PULPWOOD CUTTERS REACH ACCORD

Union pulpwood cutters in the Grays Harbor district have reached an agreement with pulpwood contractors whereby they have returned to work. The cutters get the same amount per cord, but the "unit cord" has had 4 inches taken off the length of the pieces. This, it is said, will give the cutters about 20 cents more a cord.

PULP MILL PIPE LINE VOTED

By a majority of almost 15 to 1 citizens of Everett, Wash., at a special election, voted a \$175,000 bond issue to finance construction of a pipe line across the city to supply water to the pulp mill of the Weyerhaeuser Timber Company.

RAINIER DECLARES DIVIDEND

Rainier Pulp & Paper Co., Shelton, Wash., has declared a dividend of \$1.50 per share on the company's class A common stock, payable October 15 to stockholders of record October 10. With the payment of this dividend all preferential dividend arrearages on the class A common stock will have been eliminated.

SPOKANE SPRAYS STREETS WITH SULPHITE

The City of Spokane this season discontinued spraying unpaved streets with oil and is now using sulphite waste liquor entirely. The city employs three trucks hauling sulphite from the Millwood plant of the Inland Empire Paper Co. In order to put the streets in condition for winter 12,000 gallons of sulphite are now being sprayed on them.

BARGING PULP LOGS TO GRAYS HARBOR

The barge North Bend, owned by the Knappton Towboat Company, Astoria, is now on regular schedule, transporting hemlock pulpwood logs from Willapa Harbor to the plant of the Grays Harbor Pulp & Paper Co., Hoquiam, Wash. The barge handles about 250,000 feet of logs. Last season she transported about 6,000,000 feet of hemlock logs from Willapa Harbor to the St. Helens Pulp & Paper Co., St. Helens, Ore.

NOBODY WANTS THE JACKASS

Here's a stunt reported by the Kalamazoo Vegetable Parchment Company, Kalamazoo, Michigan. This company uses a desk size jackass which is constantly waiting to become the guest of the department having the worst accident record. If the entire plant goes a month without an accident he is left on the plant manager's desk for a month. If two months elapse without an accident, he is placed on the president's desk where he remains as long as no accidents occur. The slogan throughout the mill is, "Drive the jackass to the main office."

BRAZIL

The Brazilian Paper Industry embraces the operations of 23 important mills producing about 60,000 metric tons annually and turning out a wide variety of papers. Newsprint, cigarette paper and a few minor lines have to be imported. Leading importations during 1933 were: newsprint, 35,249 tons; other printing papers, 1,965 tons; cigarette paper, 857 tons; writing paper, 343 tons, and miscellaneous papers, 1,169 tons. —From U. S. Dept. of Commerce.